

# The identification of the eggs of the smaller Indian Cuckoos

BY

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It is difficult to be certain of the identity of cuckoos' eggs found in nests in regions where more than one species is present. Such eggs tend to be identified from oviduct eggs or by the apparent relative size of the cuckoo species, by the species distribution, or by reference to published information on egg collections. If earlier identifications were at fault errors can be perpetuated in such published information. An examination of collected material on which published information has been based, and in particular that of E. C. S. Baker, revealed that the eggs of *Chrysococcyx maculatus* and *C. xanthorhynchus* appeared to have been confused but were separable into two distinct types, similar host species being used by both. Further field observation is needed to confirm the suggested reidentification. The eggs of *Cacomantis merulinus* appear to have been satisfactorily identified. The identification of eggs of *Surniculus lugubris* and *Cacomantis (Penthoceryx) sonneratii* is very dubious, and, in the material examined, there would appear to be no certainly identified eggs of these from the Indian region. More field observation is required to clarify the situation. Random collecting is of little value for this, and it would appear to be more profitable to record measurements and appearance of the cuckoo's eggs in the host's nest and to identify the juvenile cuckoo after it has hatched.

The identification of the eggs of cuckoos is one of the least satisfactory aspects of the study of avian parasitism. Once an object such as an egg is separated from the body of the parent bird there must be some element of doubt concerning its origin, and the identification from an egg, of the cuckoo species which laid it, when the egg has been produced at some unspecified earlier date by a bird that may no longer be apparent in the locality where the nest is found, is an exercise heavily weighted with the likelihood of error.

The only *certain* egg of a cuckoo is an oviduct egg, taken from the organs of a dead bird. Since such an egg has not been laid it is possible that it will be incompletely formed, and if the shell lacks its final superficial layers its appearance may differ to some degree from that of the egg that would finally be produced. Blue colour and spotted patterns are usually present throughout the thickness of the shell (Harrison 1966a) and would be visible at any stage, but the final layer producing buff or greenish-coloured eggs would not be present until the egg was fully formed. In assessing the usefulness of the oviduct egg it is also necessary to ensure that the bird itself has been correctly identified.

In addition to oviduct eggs, egg size may aid identification. Within a genus the size of the egg laid may vary according to the body size of the species which produces it. Collectors in the past have recognised this and attributed larger eggs to larger birds. It may, however, result in some anomalies. In both the Indian region and Central Africa there are two species of *Clamator* cuckoos showing some degree of sympatry but differing in size. They lay rather rounded, unmarked, pale blue eggs. The smaller bird, the Pied Crested Cuckoo, *Clamator jacobinus* occurs, and is at present regarded as the same race, *C. j. pica*, in both regions. In Africa a slightly larger bird, Levaillant's Cuckoo, *C. levaillanti*, is also present in some areas ; while in India the smaller bird may be sympatric with the much larger Redwinged Crested Cuckoo, *C. coromandus*.

Although the usually measured dimensions of wing, tail, tarsus, and bill, are similar in *C. jacobinus* in both areas the upper range of egg size is greater in India where the other species is also larger. The picture is confused still further by the fact that the Black-and-White Cuckoo, *C. serratus*, of South Africa is now regarded as a race of *C. jacobinus*, but lays large white eggs, although its measurable dimensions do not differ from those of the latter. There are therefore the possibilities that *C. jacobinus* may vary its egg size in relation to that of the sympatric congeneric species, or that the body size may vary independent of other dimensions and that its variation may be masked by the similarity of the parts normally measured. But in addition it seems possible that in subjectively assigning identifications to eggs, the collectors have made assumptions based on the expected size-range in relation to the other species present and that there is again a possibility of error.

Another aid to the identification of these eggs is the information on species distribution. In some cases only one or two cuckoo species may occur, and in such regions it will be possible to identify and describe eggs accurately, and such information may then be used to separate the eggs in areas where more species are present. This method has been widely used in the case of the many small cuckoo species of the Oriental region but it depends mainly on published information, and unfortunately an early published error can be perpetuated and lead to extensive misidentification of material collected during the subsequent period.

Most of such identification during recent decades has been based on the extensive collections and the publications of E. C. Stuart Baker, notably the volumes on birds of the second edition of the FAUNA OF BRITISH INDIA (Baker 1924-1930) and the NIDIFICATION OF THE BIRDS OF THE INDIAN EMPIRE (Baker 1932-1935). It is therefore to be regretted that a recent examination of the Baker Collection has shown (Harrison 1966b ; Harrison & Parker 1966, 1967a, 1967b) that while the great majority of the eggs are genuine there has also been some misidentification, and there is some evidence of falsification of data, particularly

where the eggs of rarer birds are concerned, which makes it necessary to exercise considerable caution in using Baker's published data as a source of reference.

In addition to the faults already mentioned Baker seems to have been uncritical in his acceptance of dubious material. A recent instance has become apparent during the incorporation of the eggs of the Greater Spiderhunter, *Arachnothera magna*. Baker (1932-1935) lists for this species a series of 'unusual types' of eggs. His type 2, two pinkish eggs (B. M. reg. no. 1952.11.79), and type 3, a reddish egg (B. M. reg. no. 1952.11.78), both differ from the eggs of *A. magna* but are indistinguishable in shape, colour, markings, and gloss, from the eggs of the Bulbul, *Pycnonotus atriceps*, of the same localities; and this can be established by comparison with Baker's own eggs of the latter species. In view of the shape and site of the spiderhunter's nest it is most improbable that the eggs could have been placed there by the bulbul and they must have reached the nest with human aid. It seems remarkable that the similarity of the eggs to those of another species, and their complete dissimilarity to those of the species building the nest, should have escaped Baker's notice; although his remarks concerning his collectors suggest that he was unduly naïve about human nature and the possible outcome of an over-assiduous desire to please.

Another comment should perhaps be added here. Type 1 of Baker's unusual eggs of *A. magna* is pale green with blackish blotches. Baker states in his catalogue that the eggs on which this is based were taken by him and H. N. Coltart in 1903. Another clutch of this type from the same source came to the British Museum via the Davidson collection. There are five eggs in all and they differ from all eggs of *A. magna* in their colour and markings. They closely resemble the eggs of *Passer* species and although it has not been possible to find any exact match among available Indian eggs of this genus, it was found that if put with a selection of eggs of the Spanish Sparrow, *Passer hispaniolensis*, these alleged *A. magna* eggs could not be distinguished apart, and could only be separated again by reference to the setmarks. In the circumstances it seems advisable to defer recognition of such eggs as variant egg of *A. magna* unless further and more satisfactory evidence is available.

In view of such misidentifications it seems advisable to treat Baker's work on the cuckoos with some caution. Undoubtedly both he and Coltart misidentified eggs collected in Assam in the period 1900-1910, but most of these passed into other collections. For example, the British Museum received, with the Davidson collection, eggs identified as *Chrysococcyx xanthorhynchus* by Baker and Coltart, but which are half as large again as eggs of that species and are the broad, pink-spotted eggs subsequently identified by them as those of *Cacomantis* (*Penthoceryx*) *sonneratii*. Some of the inscriptions on eggs in Baker's collection reveal

subsequent revision of earlier identification. However, in Baker's final collection on which his NIDIFICATION (1932-1935) was based much of the obviously erroneous material had been eliminated. It has not yet been possible to study all the cuckoos' eggs in detail, but after an overall examination of these eggs it is possible to make some general comments about them and to include some more detailed criticism of some of the material.

There are few immediately apparent anomalies among the eggs of the species of larger cuckoos of the genera *Clamator* and *Cuculus*, apart from a disquieting similarity between eggs identified as those of *Cuculus poliocephalus* and *C. saturatus*, and except for this these may well represent valid material if one allows for the reservations already expressed concerning the separation of similar eggs of different species on size criteria alone.

### **Chrysococcyx maculatus and C. xanthorhynchus**

For the smaller species the situation is less satisfactory. Baker had short series of clutches with hosts' eggs for the Emerald Cuckoo, *Chrysococcyx maculatus*, and the Violet Cuckoo, *Chrysococcyx xanthorhynchus*. He claimed that the eggs of the two could not be distinguished apart, and his identification of the species responsible for any particular egg was based on the bird seen in the locality. A close examination of the series reveals a situation similar to that found in a study of his eggs of the White-tailed Blue Chat and the Large Niltava (Harrison & Parker 1966) where allegedly indistinguishable eggs proved to consist of two mixed series of eggs of quite distinct types. The above two series of cuckoos' eggs showed eggs of two distinct types mixed together. It was possible to separate these. Since *C. maculatus* occurs further west and north in the Himalaya than does *C. xanthorhynchus*, and since some of the eggs from this area were received from A. M. Primrose and C. M. Inglis who had watched nests with similar eggs to determine which cuckoo emerged from the egg, it was possible to assign one type of egg to *C. maculatus* with reasonable confidence. It was also reasonable to assume that the other type was of eggs of *C. xanthorhynchus* since they appeared to fulfil the minimal requirements of habitat and anticipated size.

Of the six apparent eggs of *C. xanthorhynchus* four are of a reasonably standard type. They are broadly ovate but with a distinct taper at one end, and they show a glossy surface, although not so glossy as that of the eggs of the Plaintive Cuckoo, *Cacomantis merulinus*. They vary considerably in colour. One with an egg of the Streaked Fantail Warbler, *Cisticola juncidis*, is white with sparse light brown flecks and a few irregular greyish blotches at the larger end. Another with eggs of the Tailor Bird, *Orthotomus sutorius*, is white with fine dark brown speckling and blotching, and is very heavily marked in a broad zone around, and



almost capping, the larger end. An egg with those of the Little Spider-hunter, *Arachnothera longirostris*, is pinkish-white speckled, blotched and streaked with light red, underlying markings showing faintly purple. The last, with eggs of the Grey-headed Flycatcher Warbler, *Seicercus xanthochistos* is similar to the last but much more heavily freckled and streaked with purplish red. The four eggs measure  $16.7 \times 12.8$ ,  $16.7 \times 13.1$ ,  $16.7 \times 12.7$ , and  $16.6 \times 12.5$  mm., and their weights range from 83 to 107mg. [I find that Baker's measurements of his eggs are consistently from 0.4 to 0.7 mm. less than more recent measurements of the same specimens.]

In addition to the above there is an egg found with a *Cisticola juncidis* clutch which resembles these other eggs in shape but is slightly rounder and blunter, measuring  $16.5 \times 13.3$  mm. and weighing 78 mg. It is heavily marked with small round blotches, especially towards the larger end, with additional large underlying blotches appearing grey and tending to form a distinct ring around the larger end. Unlike the other eggs the surface lacks the gloss and in this respect it resembles more closely the eggs of *C. maculatus*, but in other respects it appears to resemble an egg of *C. xanthorhynchus*. The sixth egg was found with an egg of the Yellow-backed Sunbird, *Aethopyga siparaja*. It is both small and light, measuring  $15.5 \times 12.3$  mm. and weighing 50 mg. It closely resembles the sunbird egg with which it was found in both colour and markings, and Baker's alternative suggestion that it might be an abnormally large egg of the sunbird cannot be wholly discounted.

There appear to be no oviduct eggs available, and there is no comparative material from elsewhere. A series of five eggs from the collection of Sir W. Williamson, taken from nests of the Ashy Tailor Bird, *Orthotomus sepium* in southern Thailand and attributed to *C. xanthorhynchus* are almost certainly typical eggs of *Cacomantis merulinus* from the smaller end of its size range.

There are twelve apparent eggs of *Chrysococcyx maculatus*, one being from Primrose via the Davidson collection, the others from Baker's collection. The host species are—*Aethopyga siparaja* (6 occasions), *Arachnothera longirostris* (5), and *Cisticola juncidis* (1),—thus showing a complete overlap in host selection with that of *C. xanthorhynchus*. The egg measurements are—average,  $16.9 \times 12.5$ ; maxima  $18.2 \times 12.9$ ,  $18.1 \times 13.5$ ; minima,  $16 \times 12.6$ ,  $16.3 \times 11.9$  mm.—and the weight range is 70-100 mg., average 85 mg. In these characters they show no obvious difference to distinguish them from the eggs of *C. xanthorhynchus*, but they differ distinctly from those of the previous species in their appearance. Although the measurements are similar the profiles differ. Eggs of *C. maculatus* are oblong-ovate; the narrow end being much broader and more rounded than that of *C. xanthorhynchus*. The surface texture is matt and not glossy, and with a slight roughness perceptible to the touch. One egg (B. M. reg. no. 1952.11.80) does, however, have a slight

gloss. The colour is generally white with drab brown blotches and specklings, which may be generally distributed or may be limited mainly to a narrow zone around the larger end, giving the pattern a very close resemblance to that of *Arachnothera longirostris*. The only obvious difference is that the markings on the eggs of the latter are chestnut-red and not dull brown, but some of the cuckoo eggs found with clutches of *A. longirostris* do show a warmer brown colour than those found with other hosts. Two clutches (B. M. reg. no. 1952.11.173-4) which Baker thought to be cuckoos' eggs with eggs of *A. longirostris* are considered to be slightly atypical clutches of the latter species, and have been provisionally placed with them. Again there is no comparative material to hand. The egg from Lebong, Sikkim, described by Hume (1890) and later by Oates (1903) as that of *C. maculatus* is in fact a reddish-brown egg of *Cuculus poliocephalus* (B. M. reg. no. 1891.3.20.8154).

### **Cacomantis merulinus**

The eggs of the Plaintive Cuckoo, *Cacomantis merulinus* present no difficulties of identification. The species usually parasitises small warblers such as species of the genera *Orthotomus*, *Prinia*, and *Cisticola*. The eggs are distinctly elongated and slightly oblong-ovate, with a definite gloss. They may be pale blue or white with varying amounts of reddish spots or blotches. They may show some degree of mimicry of the hosts' eggs, as in the case of blue eggs with large red-brown blotches and spots found with similarly-coloured eggs of *Prinia inornata*, and reddish-buff one with the bright chestnut-red eggs of *P. socialis*. Thirty-three eggs from the museum collection, other than those of the Baker collection, measure—average  $18.5 \times 13$  mm., maxima  $20.5 \times 13.8$  mm., minima  $17.4 \times 11.9$  mm. The averages are about 0.5 to 0.7 mm. smaller than those given by Baker.

### **Surniculus lugubris and Cacomantis (Penthoceryx) sonneratii**

The identification of the eggs is extremely unsatisfactory for both the Banded Bay Cuckoo, *Cacomantis (Penthoceryx) sonneratii* and the Drongo Cuckoo, *Surniculus lugubris*. The birds appear from skins to be roughly similar in size, with *C. sonneratii* perhaps a little smaller, but absolute comparison is difficult since *S. lugubris* is a Drongo mimic with long wings and tail.

Baker had two eggs of *S. lugubris* collected by Sody in Java with eggs of the Rusty-vented Bulbul, *Trichastoma sepiaria* (B. M. reg. no. 1952.11.148, 150). The eggs mimic those of the host closely. Dr. J. H. Becking (pers. comm.) who has collected such eggs in Java also observed the cuckoo which hatched from them to confirm identity. Baker (1942) illustrates one clutch but confuses the egg of the host with that of the cuckoo. The eggs are a normal ovate shape but taper less than those of the host and measure  $20.9 \times 15.4$  and  $20.7 \times 15.3$  mm.

Other eggs attributed by Baker to this species are less satisfactory. Baker had one egg taken in a nest of Leschenault's Forktail, *Enicurus leschenaulti*, in Malaya and sent to him. He described it (Baker 1932-1935) under *S. l. brachyurus* as having a pale creamy ground colour with a few faint specks of rusty red scattered all over it, and as being a short broad ellipse, measuring  $19.5 \times 14.9$  mm. If it were a cuckoo's egg it most closely resembled some examples of *Cuculus poliocephalus* to which it might more satisfactorily be attributed. It was very thin-walled and shattered in the hand during examination, and there is a possibility that it might have been an abnormal dwarf egg of the host species. Another specimen with the same host, taken in Assam and listed by Baker (1932-1935) under *S. l. dicruroides* is oblong-ovate with a creamy ground tint and numerous specks and flecks of brown and grey-brown generally distributed but increasing towards the larger end. This measures  $22 \times 15.2$  mm. (B. M. reg. no. 1952.11.52). It is almost indistinguishable from some eggs attributed to *Cuculus saturatus* and might more reasonably be suspected to belong to that species.

There are two eggs from other sources in Baker's collection attributed by him (Baker 1932-1935) to *S. l. stewarti*. One is with a clutch of *Aegithina tiphia* and was taken by W. E. Wait at Colombo, Ceylon (B. M. reg. no. 1952.11.54). It measures  $17.5 \times 13.8$  mm. The other is with a clutch of *Rhopocichla atriceps* and was taken by J. Stewart in Travancore (B. M. reg. no. 1952.11.158). It measures  $19.4 \times 14.6$  mm. Baker (1932-1935) refers to three eggs of the latter type but only one appears in his collection. Both the above eggs are similar to those of the host but much more sparsely marked, mostly at the larger end. Both are distinctly smaller than other eggs attributed to *S. lugubris*. In both measurement and shell-weight they are indistinguishable from typical eggs of the hosts. On the egg with the clutch of *R. atriceps* the markings are sparser than those on the eggs with which it was found but are otherwise similar to those of the host's eggs in size, type, and colour. The markings of the egg found with eggs of *A. tiphia* are small brown and grey spots around the larger end, while those of the host's eggs are elongated brown or grey blotches; but an examination of a series of eggs of *A. tiphia* reveals that spots may occur in place of blotches and the egg in question, while atypical of the clutch, would not, be atypical of the species.

These eggs were examined through a binocular microscope and it was found that the shells of the two alleged *S. lugubris* eggs differed in their superficial appearance and more closely resembled in surface texture the eggs of the species with which they were found than they resembled each other in this respect. In the circumstances the most economical hypothesis would be to suppose that these two eggs were in fact eggs of the species presumed to be the host in each case; although this would not

explain the appearance of an egg dissimilar in pattern in a clutch of eggs of a species where such a difference does not normally occur.

Of the comparative material available, the Himalayan specimen from the Crowley Bequest listed by Oates (1903) is a small egg,  $19.8 \times 13.6$  mm., rather slender, with a glossy surface, and cream-coloured with light reddish-brown blotches especially around the larger end, (B. M. reg. no. 1901.12.15.474). It appears to be an egg of *Cacomantis merulinus*. The other egg listed by Oates, taken with *Pycnonotus aurigaster* in Java measures  $20.5 \times 14.5$  mm. (B. M. reg. no. 1901.12.15.475). It is pale creamy-buff with a zone of fine reddish marks around the larger end and with some sparse flecks elsewhere. It is rather oblong-ovate in shape, and has little gloss. It is of the type listed by Hoogerwerf (1949) as belonging to *Cacomantis variolosus*; it is dissimilar to the javanese eggs of *S. lugubris* from the nest of *T. sepiaria* mentioned above, and it has a general resemblance in shape, texture, size, and colour to eggs of *Cuculus poliocephalus*.

There would therefore appear to be no definitely identified eggs of *Surniculus lugubris* from the Indian region, in spite of the fact that the species is said to be widely distributed.

The eggs attributed to *Cacomantis sonneratii* appear to be equally unsatisfactory. Baker (1932-1935) mentions an oviduct egg taken by Kemp, on which he bases his subsequent identifications. This egg was received by the Museum with Davidson's collection (B. M. reg. no. 1925.12.25.5903). It was taken by Kemp at Kalakbund, India, on 1st July 1893, and is stated to be an oviduct egg. It is relatively large,  $16.9 \times 22.1$  mm., and is broadly ovate. It has a glossy surface and has a pinkish ground colour profusely covered with fine purplish-red specks.

Hume (1890) stated that fragment of egg from the oviduct of a shot female were immaculate bluish-green, but subsequently recognised eggs from nests of the Redwhiskered Bulbul, *Pycnonotus jocosus*, as belonging to this species; two from Coorg, south India, collected on 18 July 1879 (B. M. reg. no. 1891.3.20.8151, 8152) (Oates 1903) being received with his collection. They are both white, one with a few scattered specks, the other evenly marked with fine short dashes and streaks of brown. They measure  $21.4 \times 16.3$  and  $20.8 \times 15.6$  mm. Other browner and more heavily marked eggs from the same host came to the museum with the Davidson Collection.

These eggs are relatively large if one assumes that *C. sonneratii* should lay smaller eggs than those of *S. lugubris*, and in Java, Bartels (1928-1929) was of the opinion that the dissimilar spotted eggs of the same size as those of the hosts, found in the nests of *Aegithina tiphia*, were eggs of *C. sonneratii*. Dr. J. H. Becking (pers. comm.) has suggested that the egg found with a clutch of *A. tiphia* and mentioned above when discussing



*S. lugubris* may be an egg of *C. sonneratii*; but for the reasons given I have some doubts about this.

Baker accepted the larger, pink-spotted eggs as typical and amassed a series of 69 eggs with those of the hosts, attributing them to this species. As a series the alleged cuckoo eggs are highly variable, the measurement ranges being—length 18·9-22·3 mm., breadth 14·5-17·2 mm., and the averages being 20·7 and 15·8 respectively. The size range encompasses that of the Javanese eggs of *S. lugubris* and some of the eggs attributed to *C. sonneratii* are indistinguishable from the latter in shape and surface texture. It seems possible that this series might represent a mixture of eggs of both species. An examination of statistical data does not, however, reveal any bimodal distribution that might confirm this. The eggs vary considerably in shape, but these shapes tend to intergrade to an extent where any separation on this character is impossible.

The main host species, with numbers of clutches, are—Nepal Babbler, *Alcippe nipalensis*, (30); Brown Bush Warbler, *Bradypterus luteoventris*, (5); Bulbuls, *Pycnonotus* spp., (4); Tailor Bird, *Orthotomus sutorius*, (3); Spotted Babbler, *Pellorneum ruficeps*, (3); Brown Babbler, *P. albiventris*, (2); and Redheaded Babbler, *Stachyris ruficeps*, (3). In addition there is a long list of host species of only single occurrence.

Several distinct types of colouring and marking are apparent among these cuckoo eggs. Some, usually broadly ovate eggs, are heavily marked with purplish speckling and often have a dark ground colour; many are finely speckled in purplish or pink on a pale or slightly tinted ground colour; and a few are blotched with buff and brown and tend to be more bluntly rounded at the narrow end. These types are not sufficiently distinct to form exclusive entities since some apparently linking forms exist. One fact that does become apparent when colour and markings are considered is that a number of these eggs, while quite distinct from the eggs with which they are placed, are extremely similar to eggs of other passerine species, notably bulbuls, Pycnonotidae; and in the case of the buff-blotched eggs similar to those of some species of the thrush family, Turdidae. In view of what was said earlier concerning apparent anomalous occurrences of odd eggs of some passerine species in the nests of others, this possibility cannot wholly be dismissed.

We therefore have the various possibilities that these eggs may be those of *C. sonneratii* and that this species lays large and variable eggs; or that they are a mixture of the eggs of the last species and those of *S. lugubris*; or that they are the eggs of *S. lugubris* only; and that some or all might be eggs of passerine species placed, presumably in some cases at least with the aid of human hands, in the nests of different species.

## FINAL COMMENTS

From the preceding account it can be seen that the eggs of some of the smaller Indian cuckoos cannot be identified with any real certainty by use of the collected material at present available. Of the five species discussed, the eggs of *Cacomantis merulinus* can be certainly identified, and it now seems possible to separate the eggs of *Chrysococcyx xanthorhynchus* and *C. maculatus*, although this requires confirmation by further field observation; but the appearance of Indian eggs of *Cacomantis sonneratii* and *Surniculus lugubris* has still to be established. The further random collection of eggs would not seem likely to clarify this situation. What is needed is a more certain method of linking the cuckoo's egg with the species which laid it.

It is only in the most exceptional circumstances, or after an extremely long and careful period of field observation such as that undertaken by Chance (1922, 1940) for the Eurasian Cuckoo, *Cuculus canorus*, that a cuckoo is likely to be observed in the act of laying its egg. It would therefore seem more profitable to find the cuckoo's egg in the nest of the host, to carefully record the size, shape, and colouring, and then to subsequently observe the nest until the young cuckoo hatches, after which there may be a chance of establishing the identity of it. For this purpose a key to the identification of juvenile cuckoos would be desirable, since such information is often lacking in the normal descriptive handbooks.

In view of the recent advances in maintaining small birds under avicultural conditions it should be possible to keep such small cuckoos and possibly induce them to lay if nests were provided. In such circumstances one could be certain of the species responsible for the production of any eggs that were laid, although some allowance might need to be made for possible atypical eggs resulting from the slightly abnormal conditions.

Under such conditions it might also be possible to rear a fledging cuckoo that could not be satisfactorily identified at an early stage in its development.

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